AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An apparatus for manufacturing a coil spring from a wire, comprising

a. a coil-spring winder that forms the wire into a coil spring having a plurality of turns; and

b. a wire holder, including a reel being rotatable about a reel axis having a wire comprising a plurality of strands twisted together, that supplies the wire to the coil-spring winder along a feed direction, the wire holder supported, along a holding axis, by a coupling that allows the wire holder to rotate freely about the holding axis in response to a torque acting about a cross section of the wire,

wherein the holding axis is oriented at a non-zero angle with respect to the reel axis, and rotation of the wire holder about the holding axis substantially alleviates the torque accumulated in the wire.

2. (Original) The apparatus of claim 1, wherein the holding axis is essentially aligned with the feed direction.

3. (Original) The apparatus of claim 1, wherein the rotation of the wire holder is synchronous with formation of the turns of the coil spring by the coil-spring winder.

4. (Canceled)

5. (Previously Presented) The apparatus of claim 1, wherein the strands are overlaid.

6. (Previously Presented) The apparatus of claim 1, wherein the strands are braided.

7. (Previously Presented) The apparatus of claim 1, wherein the strands are helically twisted along a common axis.

8. (Previously Presented) The apparatus of claim 1, wherein at least one of the strands has a cross-section shape selected from a group consisting of round, ellipse, square, rectangle, rhombus, polygon, and polygon having curved edges.

9. (Previously Presented) The apparatus of claim 1, wherein at least one of the strands is essentially flat.

10. (Canceled)

11. (Previously Presented) The apparatus of claim 1, wherein the reel axis is essentially orthogonal to the feed direction.

12. (Withdrawn) The apparatus of claim 10, further including a retainer disposed on the wire holder, aligned substantially along the reel axis, and discouraging a segment of the wire from departing by more than a predetermined distance from the supply of the wire on the reel.

13. (Withdrawn) The apparatus of claim 12, further including a supply sensor operatively engaged with the retainer, sensing a position of the retainer relative to the reel axis.

14. (Withdrawn) The apparatus of claim 13, wherein the supply sensor further computes length of the wire remaining on the reel, based on the position of the retainer and at least one physical property of the wire.

15. (Withdrawn) The apparatus of claim 12, wherein the retainer is a cylindrical roller.

16. (Withdrawn) The apparatus of claim 12, wherein the retainer is spring-mounted for pressing against the supply of the wire by the force of a spring.

17. (Previously Presented) The apparatus of claim 1, further including a motor for rotating the reel about the reel axis, and for dispensing the wire along the feed direction from the wire holder.

18. (Withdrawn) The apparatus of claim 17, further including a clutch operatively engaged with the motor and the reel, for imparting a rotation about the reel axis to the reel from rotation of the motor.

19. (Withdrawn) The apparatus of claim 18, wherein the first clutch comprises a magnetic particle clutch.

20. (Withdrawn) The apparatus of claim 10, further including a brake operatively engaged with the reel for controlling the speed of rotation of the reel.

21. (Withdrawn) The apparatus of claim 20, wherein the brake comprises a magnetic particle brake.

22. (Original) The apparatus of claim 17, further comprising a tension sensor for measuring longitudinal tension along the wire.

23. (Original) The apparatus of claim 22, further comprising a motor controller responsive to the longitudinal tension measured by the tension sensor and being operatively engaged with the motor for regulating speed or direction of rotation of the motor.

24. (Withdrawn) The apparatus of claim 18, further comprising a tension sensor for measuring longitudinal tension along the wire.

25. (Withdrawn) The apparatus of claim 24, further comprising a clutch controller responsive to the longitudinal tension measured by the tension sensor, and for regulating the actuation of the clutch.

26. (Withdrawn) The apparatus of claim 20, further comprising a tension sensor for measuring longitudinal tension along the wire.

27. (Withdrawn) The apparatus of claim 26, further comprising a brake controller responsive to the longitudinal tension measured by the tension sensor, and for regulating actuation of the brake.

28. (Original) The apparatus of claim 1, further including a motor for rotating the wire holder about the holding axis.

29. (Withdrawn) The apparatus of claim 28, further including a clutch operatively engaged with the motor and the wire holder, for imparting a rotation about the holding axis to the wire holder from rotation of the motor.

30. (Withdrawn) The apparatus of claim 29, wherein the clutch comprises a magnetic particle clutch.

31. (Withdrawn) The apparatus of claim 1, further including a brake operatively engaged with the wire holder for controlling speed of rotation of the wire holder about the holding axis.

32. (Withdrawn) The apparatus of claim 31, wherein the brake comprises a magnetic particle brake.

33. (Original) The apparatus of claim 28, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

34. (Original) The apparatus of claim 33, further comprising a motor controller responsive to the torque measured by the torque sensor, the motor controller being operatively engaged with the motor for regulating speed or direction of rotation of the motor.

35. (Withdrawn) The apparatus of claim 29, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

36. (Withdrawn) The apparatus of claim 35, further comprising a clutch controller responsive to the torque measured by the torque sensor, for regulating actuation of the clutch.

37. (Withdrawn) The apparatus of claim 31, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

38. (Withdrawn) The apparatus of claim 37, further comprising a brake controller responsive to the torque measured by the torque sensor, for regulating actuation of the brake.

39. (Withdrawn) A method for manufacturing a coil spring from a wire, comprising the steps of:

a. with a wire holder, holding the wire;

b. from the wire holder, dispensing the wire along a feed direction to a coil-spring winder;

c. with the coil-spring winder, forming the wire into a coil spring having a plurality of turns; and

d. rotating the wire holder about a holding axis to reduce a torque acting about a cross section of the wire.

40. (Withdrawn) The method of claim 39, further comprising aligning the holding axis essentially along the feed direction.

41. (Withdrawn) The method of claim 39, further comprising synchronizing the rotating of the wire holder with the forming, by the coil-spring winder, of the turns of the coil spring.

42. (Withdrawn) The method of claim 39, wherein the wire comprises a plurality of strands.

43. (Withdrawn) The method of claim 42, wherein the strands are overlaid.

44. (Withdrawn) The method of claim 42, wherein the strands are braided.

45. (Withdrawn) The method of claim 42, wherein the strands are helically twisted along a common axis.

46. (Withdrawn) The method of claim 42, wherein at least one of the strands has a cross-section shape selected from a group consisting of round, ellipse, square, rectangle, rhombus, polygon, and polygon having curved edges.

47. (Withdrawn) The method of claim 42, wherein at least one of the strands is essentially flat.

48. (Withdrawn) The method of claim 39, further comprising employing a motor for the rotating of the wire holder about the holding axis.

49. (Withdrawn) The method of claim 48, further comprising measuring torque acting about a cross section of the wire and controlling the rotating of the wire holder in response to the torque.

50. (Withdrawn) The method of claim 48, further providing a motor controller for controlling the speed or direction of the motor rotating the wire holder.

51. (Currently Amended) An apparatus for feeding, along a feed direction, a multi-strand wire to a coil-spring winder, comprising a wire holder including a reel holding a supply of the wire and being rotatable about a reel axis and supported, along a holding axis, by a coupling that allows the wire holder to rotate freely about the holding axis in response to a torque acting about a cross section of the wire, wherein the holding axis is oriented at a non-zero angle with respect to the reel

axis, and the rotation about the holding axis substantially alleviates the torque accumulated in the wire.

52. (Canceled)

53. (Previously Presented) The apparatus of claim 51, wherein the reel axis is essentially orthogonal to the feed direction.

54. (Withdrawn) The apparatus of claim 52, further including a retainer disposed on the wire holder, aligned substantially along the reel axis, and discouraging a segment of the wire from departing by more than a predetermined distance from the supply of the wire on the reel.

55. (Withdrawn) The apparatus of claim 54, further including a supply sensor operatively engaged with the retainer, for sensing a position of the retainer relative to the reel axis.

56. (Withdrawn) The apparatus of claim 55, wherein the supply sensor comprises means for computing length of the wire remaining on the reel, based on the position of the retainer and at least one physical property of the wire.

57. (Withdrawn) The apparatus of claim 54, wherein the retainer comprises an essentially cylindrical roller.

58. (Withdrawn) The apparatus of claim 54, wherein the retainer is spring-mounted for pressing against the supply of the wire by the force of a spring.

59. (Previously Presented) The apparatus of claim 51, further comprising a motor for rotating the reel about the reel axis, for dispensing the wire along the feed direction from the wire holder.

60. (Withdrawn) The apparatus of claim 59, further comprising a clutch operatively engaged with the motor and the reel, for imparting a rotational torque from the motor to the reel.

61. (Withdrawn) The apparatus of claim 60, wherein the clutch is a magnetic-particle clutch.

62. (Withdrawn) The apparatus of claim 52, further including a brake operatively engaged with the reel for controlling the speed of the rotation of the reel.

63. (Withdrawn) The apparatus of claim 62, wherein the brake comprises a magnetic-particle brake.

64. (Original) The apparatus of claim 59, further comprising a tension sensor for measuring longitudinal tension along the wire.

65. (Original) The apparatus of claim 64, further comprising a motor controller responsive to the longitudinal tension measured by the tension sensor, and being operatively engaged with the motor for regulating the speed or direction of rotation of the motor.

66. (Withdrawn) The apparatus of claim 60, further comprising a tension sensor for measuring longitudinal tension along the wire.

67. (Withdrawn) The apparatus of claim 66, further comprising a clutch controller responsive to the longitudinal tension measured by the tension sensor, and for regulating actuation of the clutch.

68. (Withdrawn) The apparatus of claim 62, further comprising a tension sensor for measuring longitudinal tension along the wire.

69. (Withdrawn) The apparatus of claim 68, further comprising a brake controller responsive to the longitudinal tension measured by the tension sensor, and for regulating actuation of the brake.

70. (Original) The apparatus of claim 51, further comprising a motor for rotating the wire holder about the holding axis.

71. (Withdrawn) The apparatus of claim 70, further including a clutch operatively engaged with the motor and the wire holder, for imparting a rotation about the holding axis to the wire holder from rotation of the motor.

72. (Withdrawn) The apparatus of claim 71, wherein the clutch is a magnetic particle clutch.

73. (Withdrawn) The apparatus of claim 51, further including a brake operatively engaged with the wire holder for controlling speed of the rotation of the wire holder about the holding axis.

74. (Withdrawn) The apparatus of claim 73, wherein the brake is a magnetic particle brake.

75. (Original) The apparatus of claim 70, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

76. (Original) The apparatus of claim 75, further comprising a motor controller responsive to the torque measured by the torque sensor, and being operatively engaged with the motor for regulating speed or direction of the rotation of the motor.

77. (Withdrawn) The apparatus of claim 71, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

78. (Withdrawn) The apparatus of claim 77, further comprising a clutch controller responsive to the torque measured by the torque sensor, for regulating actuation of the clutch.

79. (Withdrawn) The apparatus of claim 73, further comprising a torque sensor for measuring torque acting about a cross section of the wire.

80. (Withdrawn) The apparatus of claim 79, further comprising a brake controller responsive to the torque measured by the torque sensor, for regulating actuation of the brake.

81. (Currently Amended) An apparatus for manufacturing a coil spring from a wire, comprising

a. a coil-spring winder that forms the wire into a coil spring having a plurality of turns, and that operates by pulling inwardly a supply of wire, and periodically stopping the supply of wire for forming a coil, and

b. a wire holder, including a reel being rotatable along a reel axis, that supplies the wire to the coil-spring winder along a feed direction, the wire holder supported, along a holding axis, for free rotation about the holding axis in response to a torque acting about a cross section of the wire, and the wire holder being driven in synchronized operation with the coil-spring winder, for periodically starting and stopping the inward supply of wire,

wherein the holding axis is oriented at a non-zero angle with respect to the reel axis, and rotation of the wire holder substantially alleviates the torque accumulated in the wire.

82. (Currently Amended) An apparatus for manufacturing a coil spring from a wire, comprising

a. a coil-spring winder that forms the wire into a coil spring having a plurality of turns, and

b. a wire holder, including a reel being rotatable about a reel axis, that supplies the wire to the coil-spring winder along a feed direction, the wire holder supported, along a holding axis, for free rotation about the holding axis in response to a torque acting about a cross section of the wire,

c. a tension sensor for measuring longitudinal tension along the wire, and being responsive to the measured tension for regulating the speed or direction of rotation of the wire holder,

wherein the holding axis is oriented at a non-zero angle with respect to the reel axis, and rotation of the wire holder substantially alleviates the torque accumulated in the wire.

83. (Currently Amended) An apparatus for manufacturing a coil spring from a wire, comprising

a. a wire holder assembly, having

a wire including a plurality of strands twisted together;

a wire holder, including a reel being rotatable along a reel axis, for holding the wire; and

a low-friction coupling with a first axis rotationally linked to the wire holder, wherein a torque acting about a cross section of the wire is mechanically converted into a rotation of the wire holder about the first axis such that the rotation substantially alleviates the torque accumulated in the wire, the first axis being oriented at a non-zero angle with respect to the reel axis, and

b. a coil-spring winder that forms the wire into a coil having a plurality of turns.